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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 6] [1914

XXXV.—GARDEN NOTES ON NEW TREES AND SHRUBS.

W. J. Bean.

(With Plates.)

XVIII.—NEW RHODODENDRONS.

Rhododendron auriculatum, *Hemsley.*

In some respects this is one of the most remarkable of the new Chinese rhododendrons. It was discovered by Henry in Hupeh about twenty-five years ago, and he notes that it grew 20 to 30 ft. high. Wilson introduced it in 1901 for Messrs. Veitch, from whose nursery at Coombe Wood it has been distributed. It is remarkable for its late growth and flower. At Kew it never starts to grow until July, and Wilson collected it in flower in China during August. The finest plants in cultivation are at Caerhays and some of them were carrying flowerbuds last spring. On our young plants at Kew the leaves are very large, in fact the largest on any of the species that can be grown outside here, being occasionally over 1 ft. long and 4 to 5 ins. wide. They are oblong, with two auricles at the base, hairy beneath (especially when young and near the midrib), of leathery texture. Young shoots, petioles and pedicels bristly. Flowers pale rose, funnel-shaped, 3 to 4 ins. deep, scarcely so wide, six to eight in a truss. Corolla seven-lobed, bristly outside; stamens about fourteen, with glabrous filaments; style exserted, glandular. Fruit very large, $1\frac{1}{2}$ ins. long, $\frac{1}{2}$ in. thick. The scales that accompany the young growth are glandular and of a lurid crimson.

Although the foliage probably will not be of such striking size when the plants are fully grown, the species is worth growing for this and its late flowers. It may also prove useful to hybridisers in developing a later-flowering race of rhododendrons than any we have.

Rhododendron crassum, *Franchet.*

Originally found by Delavay in Yunnan nearly thirty years ago, this species was first introduced to cultivation by Mr. G. Forrest for Mr. Bulley. It has recently flowered with Mr. E.

(3343.) Wt. 225–595. 1,125. 8/14. J. T. & S. G. 14.

Magor, of Lamellen, Cornwall, who kindly sent specimens to Kew. According to Forrest, who found it in shady, moist situations on the eastern flank of the Tali Range, Western Yunnan, at 11,000-12,000 ft. altitude, it is a shrub 15 to 20 ft. high. Young stems stout, scaly. Leaves 2½ to 6 ins. long, 1 to 2 ins. wide, oval or narrowly obovate, coriaceous, dark glossy green and wrinkled above, rather glaucous beneath, but thickly sown with shining brown scales; petiole fleshy, very scaly, up to 1 in long. Flowers in a terminal cluster of four to seven; corolla funnel-shaped, 3 ins. long, five-lobed (the lobes ovate-orbicular), creamy white to rosy white, fleshy in texture, scaly outside. Stamens up to 20, included in the corolla. Ovary and style scaly, the latter 2 to 2½ ins. long. Calyx five-lobed; lobes ovate or elliptical, reaching almost to the base, rounded at the apex, ½ in. long, almost transparent; peduncle thick, ½ to ¾ in. long.

R. crassum is undoubtedly very closely allied to *R. Maddeni*, and is probably no more than a geographical form of that species. The chief distinction appears to be in the lobes of the calyx, which are larger and broader than in *R. Maddeni*, although equalled in length by those of the Manipur form of the species—*R. Maddeni* var. *obtusifolium*. It will probably be hardier.

Rhododendron Hanceanum, *Hemsley.*

This species first flowered at Kew in May, 1913, and has flowered in several collections during the past spring. The plants that have blossomed are mostly about 1 ft. high, but Wilson found it on Mount Omi, in Western China, 10 ft. high. The plant is glabrous, except that the leaves are freely sprinkled beneath with small scales. Leaves clustered at the end of the shoot, very unequal in size, narrowly oval or obovate, varying from 1 to 4 ins. long and from ¼ to 1½ ins. wide; they are dark green above, paler beneath, and of a peculiarly hard, leathery texture. Flowers borne in a terminal cluster, sometimes very numerous, sometimes only six to ten, but then larger. The funnel-shaped corolla is ½ to ¾ in. long, deeply five-lobed, and varies in colour from creamy white to clear yellow. Calyx-lobes oblong, $\frac{3}{16}$ to ¼ in. long, ciliate and slightly scaly; stamens ten, white, downy at the base, anthers brown; ovary scaly; style glabrous, exserted.

The Rev. Ernest Faber appears to have first collected this rhododendron on Mount Omi at 4000 ft. altitude about 1886, but the plants in cultivation were raised from seed sent home by Wilson in 1909. It seems to be very hardy, and likely to prove a useful addition to flowering evergreens, although perhaps not a very showy one.

Rhododendron longistylum, *Rehder & Wilson.*

Raised from seeds collected by Wilson in 1908, and sent to Kew from the Arnold Arboretum, plants of this new species flowered at Kew for the first time last spring. According to the collector it is a shrub varying from 2 to 6 ft. in height, and inhabits scrub-clad slopes in Western Szechuen, where it is fully exposed to the sun. Its young shoots are glabrous and sparsely lepidote, and bear leaves over their whole length. Leaves leathery, oval, oblong, or obovate, 1 to 2 ins. long, ¼ to ¾ in. wide,



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acute, tapering at the base to a stout petiole $\frac{1}{8}$ to $\frac{1}{4}$ in. long; upper surface dark dull green, glabrous, finely reticulated with minute sunken veins; lower surface paler, dull, sparsely lepidote. Flowers white, produced in March in a terminal cluster of as many as twenty. Corolla $\frac{3}{4}$ in. long, funnel-shaped at the base, spreading at the mouth into five ovate lobes, and measuring $\frac{3}{4}$ in. across. Calyx green, 5-lobed, the lobes about $\frac{1}{12}$ in. long, ovate. Stamens ten, 1 in. long, much protruded beyond the corolla, filaments white, downy at the base; anthers yellow; style $1\frac{1}{8}$ in. long, glabrous. Calyx and pedicels scaly, the latter $\frac{1}{3}$ to $\frac{2}{3}$ in. long.

The species is allied to *R. micranthum*, but the flowers are larger and prettier, and remarkable for the length of the much exserted style.

Rhododendron lutescens, *Franchet.*

Originally discovered by the Abbé David in Mupin, Western China, about 1870, this species does not appear to have reached cultivation until Wilson introduced it in 1904. It is of interest as one of the few yellow-flowered, evergreen rhododendrons, but like most of the other species in cultivation with yellow flowers its hue is pale and ineffective. Leaves lanceolate, slenderly acuminate, up to $3\frac{1}{2}$ ins. long, lepidote on both surfaces but especially beneath. Flowers pale yellow, borne singly in the leaf-axils at and near the end of the shoot. Corolla broadly funnel-shaped, 1 in. wide. Calyx minute, scaly; stamens ten, protruded, hairy near the base; ovary lepidote; seed-vessel and pedicels both $\frac{1}{2}$ in. long, lepidote.

This species appears to be widely spread in Western China, and perhaps varies in hardiness. All the plants that have flowered in cultivation are of Wilson's introduction, but those of the Harvard Expeditions appear to be hardier than those of 1904, introduced for Messrs. Veitch.

Rhododendron moupinense, *Franchet.*

Seeds of this pretty and distinct species were collected by Wilson in China in 1908, and several plants raised from them flowered in 1913 and 1914. At Kew it flowered very prettily last March, at which time was made the photograph reproduced in the accompanying plate. According to Wilson, it is an epiphyte, and is often found growing on evergreen oaks and other broad-leaved trees.

A shrub up to 3 or 4 ft. high, young shoots at first pubescent. The leaves are very leathery, ovate, obovate, or oval, rounded or slightly cordate at the base, rounded and mucronate at the apex, $\frac{3}{4}$ to $1\frac{1}{2}$ ins. long, about half as wide, glabrous on the upper surface except that the midrib is slightly pubescent, densely covered with minute scales beneath; petiole $\frac{1}{8}$ to $\frac{1}{4}$ in. long, pubescent. Flowers apparently rarely more than three in a cluster, the widely funnel-shaped, five-lobed corolla $2\frac{1}{2}$ ins. across, of a pure, glistening white with wine-coloured spots on the upper side. Calyx-lobes shallow, rounded, ciliate; stamens ten, pubescent near the base, anthers chocolate-coloured; style exserted.

Wilson found this rhododendron in several parts of Western

Szechuen up to altitudes of 8000 ft. It is apparently quite hardy, and, from its neat close habit, should be useful for the rock garden.

Rhododendron quinquefolium, *Bisset & S. Moore.*

In its foliage this is one of the most distinct and striking of the *Azalea* group of *Rhododendron.* It is a low, deciduous shrub, probably never much more than 3 ft. high, its bifurcating branches stiff, slender, quite glabrous, bearing the leaves nearly always in terminal clusters of five radiating from a common centre, the largest being obovate, 1½ to 2 ins. long, the smallest one-third the size. They are minutely ciliate and the midrib beneath has, when young, a band of pubescence on each side, reduced later quite to the base. In the young state the beauty of the young leaves is enhanced by their tender green having a purplish margin. Flowers solitary or in pairs produced from the terminal bud along with the new shoots about the end of April. Corolla white or pinkish with yellowish spots on the upper side, five-lobed, broadly funnel-shaped, about 2 ins. wide. Calyx five-lobed, the lobes small, triangular, ciliate; stamens ten, hairy at the base, ovary and style glabrous; pedicel ½ to 1½ ins. long.

Hitherto this rhododendron has blossomed too sparingly to count for much as a flowering shrub, but its foliage is very attractive. Plants raised from seed, presented by Lord Redesdale in 1896, flowered at Kew last spring.

Rhododendron rotundifolium, *David* [*R. orbiculare,* Dcne].

Wilson introduced this well marked species during his second journey to Western China in 1904. It was originally discovered by the Abbé David more than twenty years before, and both Henry and Pratt collected it. It is one of the rarest of Chinese rhododendrons in cultivation, the finest examples being in Mr. J. C. Williams' collection at Caerhays Castle. These, when I saw them last April, were low, rather hemispherical bushes about 5 ft. through, set with a few flower buds, and in perfect health. There are three healthy, small plants at Kew, but the species is evidently better adapted for the milder counties. It has stout branchlets, glaucous and minutely glandular when young. Leaves 2 to 4 ins. long, sometimes nearly orbicular, but usually not so wide as long; they are rounded, with a small mucro at the apex, cordate at the base with a very narrow sinus, the auricles sometimes slightly overlapping, glabrous, dull green above, glaucous beneath; petiole, 1½ to 2¼ ins. long. Flowers in a terminal truss of about eight to ten. Corolla widely campanulate, 2 ins. across, rosy red, seven-lobed; calyx small; stamens fourteen, included, their filaments smooth; style glabrous; ovary slightly glandular; pedicels up to 2½ ins. long, glabrous.

In its nearly orbicular foliage, *R. rotundifolium* is very distinct, the species most resembling it in this respect being *R. Souliei* and *R. Thomsoni,* but both these are very distinct in having large calyces.

Rhododendron Souliei, *Franchet.*

A bush attaining in a wild state a height of 12 ft.; young branchlets glandular and rather viscid. Leaves roundish-ovate to orbicular, mucronate at the apex and cordate to truncate at the base, 1½ to 3½ ins. long, 1 to 2¼ ins. wide, glaucous (especially beneath), glabrous; petiole ½ to 1 in. long, glandular when young. Flowers about five or six in a terminal cluster. Corolla very open, almost saucer-shaped, of a beautiful soft shade of rose, 2 to 2½ ins. wide, five-lobed; calyx distinctly five-lobed, the lobes oblong, blunt, ¼ in. long, edged with minute glands; stamens about ten, much shorter than the corolla is wide; style glandular.

This very pretty species flowered with Messrs. Veitch in 1909, only five years after seeds had been sent home by Wilson. It flowered at Kew last May and a year previously, and is very well marked by its shallow corolla and the row of tiny dark glands regularly set on the exact margin of the calyx lobes. Plants obtained from Messrs. Veitch in 1908 are thriving very well.

Rhododendron Williamsianum, *Rehder & Wilson.*

This rhododendron, which was named and described last year in *Plantae Wilsonianae*, vol. i, p. 538, and of which Wilson sent home seeds in 1909, has not yet flowered under cultivation. The collector describes it as a pretty and distinct plant growing 4 to 5 ft. high. The young shoots are very slender, glaucous, and rather thinly furnished with gland-tipped bristles. Leaves orbicular to ovate, ½ to 1¼ ins. long and wide, apiculate, rounded to cordate at the base, glaucous and rather conspicuously net-veined beneath; petiole up to ½ in. long, purplish when young and glandular-bristly. Flowers three to five in a terminal cluster, opening in June in a wild state. Corolla campanulate, five-lobed, 1¼ ins. long, 1½ ins. wide, glabrous, described as of a pale rose and unspotted; calyx small, obscurely lobed and, like the pedicels (which are ¾ in. long) covered with glandular bristles; stamens 10, with smooth filaments; ovary glandular.

From its allies, the closest of which are apparently *R. Souliei* (easily distinguished by its larger calyx) and *R. rotundifolium* (distinguished by its larger leaves and seven-lobed corolla), this species differs most markedly in its slender, almost twiggy branchlets, diffuse branching, and the glandular-bristly character of its young shoots, petioles and pedicels. It was found by Wilson in Western Szechuen at 9000 to 10,000 ft. altitude, and will, in all probability, be hardy.

XXXVI.—DECADES KEWENSES

PLANTARUM NOVARUM IN HORTI REGII CONSERVATUM.

DECAS LXXX.

791. **Dianthus (Caryophyllastrum) tenuis,** *F. N. Williams* [Caryophyllaceae]; affinis *D. nitido*, Waldst. et Kit., caule unifloro, foliis patentibus, bracteis calycinis 5 mm. longis, floribus albis odoratis, discrepans.

Herba caespitosa, laete viridis, glabra, omnino tenuis, habitu subalpino. *Rhizoma* verticale vel parum obliquum, turiones foliosos multos haud dense aggregatos et caules floriferos paucos edens. *Turiones* 9–10 cm. longi, internodiis abbreviatis. *Caulis* circiter 20 cm. altus, tenuis, strictus, erectus, teres, uniflorus, internodiis folia duplo superantibus. *Folia* patentia, stricta, anguste linearia, acuminata, leviter uninervia, vaginam versus supra canaliculato-sulcata, vagina laminae diametrum aequante, basalia (turionum) 3·3–5 cm. longa, caulina consimilia, decrescentia, ima basi margine serrulato-scabra. *Flores* albi, grate odorati, 2·2 cm. diametro. *Bracteae calcyinae* 4, 5 mm. longae, 4–5 mm. latae, ovatae, cuspidatae, adpressae, herbaceae, paribus vix aequalibus. *Calyx* 1·6 cm. longus, in parte purpureo-suffusus, basin versus obscure nervoso-striatus, apicem versus haud attenuatus, dentibus lanceolatis acuminatis basi quincuncialiter se segentibus 7-nerviis margine anguste scariosis. *Petala* contigua, fauce immaculata, parce barbulata, barbellis albis incrassatis discretis; lamina 1 cm. longa, subrhombea, irregulariter grosseque dentata, venis 7 obscuris percursa, in unguem longiorem (1·4 cm.) abrupte attenuata. *Gynophorum* 3 mm. longum. *Ovarium* 7 mm. longum; columella placentalis 5·5 mm. longa, nitido-lucens, lutescenti-viridula, superne attenuata, ovula circiter 30 gerens.

Described from a living plant grown at Kew from seeds received under the name *D. Tenorei* from a nurseryman, in 1894. It is possible that its habitat is a subalpine locality in Italy.

The specific name is chosen from its uniformly slender habit, which applies equally to the stem, to the leaves, and to the calyx-tube.

The name *D. Tenorei* is unknown, and there is no indication in the habit of the plant of its being of cultivated garden origin. *D. tenuis* belongs to the section *Barbulatum* of the subgenus *Caryophyllastrum*, and seems to be allied to *D. nitidus*, *D. microchelus*, and *D. caesius*, but is quite different from any one of the three. The plant cannot be placed with any example of the European material of the genus in the Kew Herbarium. The associated characters which seem to mark it off from any other species are—the bearded white coarsely dentate petals, the short herbaceous cuspidate calycine bracts, and the bright green patent leaves. As to its land of origin, the only clue is the association of the specific name on the label *D. Tenorei* with that of the Italian botanist Tenore.

792. **Derris Lacei,** *Dunn* [Leguminosae-Dalbergieae]; *D. ellipticae*, Benth., facie approximat sed vexillo ecalloso et legumine glabro distat.

Frutex alte scandens, cortice rugoso, ramis lenticellatis. *Folia* 4 (–5)-juga, 22–26 cm. longa, petiolo 4–5-plo longiora, rachi glabra; stipulae caducae, 3 mm. longae; foliola superiora lateralia oblongo-lanceolata, apice abrupte vel sensim caudata, basi rotundata vel cuneata, chartacea, glabra, 8–9 cm. longa, venis marginem appropinquantibus 7–8-paribus utrinque inconspicuis; petioli 4 mm. longi; stipellae caducissimae. *Paniculae* racemi-

formes, pendulae, ex axillis foliorum delapsorum Martio florentes, 20–30 cm. longae, pedunculo brevi, rachi ut ramulis pedicellis calycibusque tenuiter ferruginea; nodi floriferi 1–4-flori. *Flores* laxi 2·2–2·4 cm. longi; pedicelli calycibus sesquilongiores; bracteae minutae; bracteolae 2, paullo infra florem. *Calyx* campanulatus, 5 mm. longus; dentes 2 superiores breves, fere coaliti, 3 inferiores triangulares, 1·5 mm. longi. *Petala* dilute rubida; vexilli lamina ovata, basi subcordata et ecallosa, glabra, reflexa, itaque in floribus pendulis erecta, marginibus revolutis; alae anguste oblongae, basi oblique truncatae; carinae petala alis paullo adhaerentes. *Stamina* monadelpha, vexillari prope basin soluto. *Ovarium* sessile, lineare, multi-ovulatum. *Legumen* lineare (5–) 10 (–20) cm. longum, 2 cm. latum, in latere seminifero ala 2–3 mm. lata, latere altero ala ad 1 mm. lata marginatum, valvis chartaceis glabris paullo reticulatis.

Burma. Maymyo Plateau, 1200 m., *Lace* 5278, 6115.

A not uncommon *Wistaria*-like climber on trees along the banks of streams. When in full flower before the foliage appears, it is a very beautiful object, with its drooping panicles of large pink flowers.

793. **Millettia subpalmata,** *Dunn* [Leguminosae-Galegeae]; species a congeribus foliis subpalmatis distincta.

Frutex vagans vel alte scandens, cortice conspicue lenticellato. *Folia* (1–) 2-juga, subpalmata, 40–60 cm. longa, petiolo 2–3-plo longiora, rachi glabra; stipulae 1 cm. longae; foliola superiora lateralia ovata, apice obtusa, basi obtuse cuneata, papyracea, supra glabra, subtus pubescentia, 20–30 cm. longa; petioluli 8 mm. longi; stipellae non visae. *Paniculae* axillares, parvae? *Flores* non visi. *Ovarium* 7-ovulatum. *Legumen* lineare, 12–18 cm. longum, 2·5–3·5 cm. latum, compressum, valvis lignosis elastice dehiscentibus dense molliter velutinis. *Semina* 4, lenticularia.

Burma. Pegu, Anigdon-kun Reserve, 100 m., *Lace* 6104.

794. **Millettia utilis,** *Dunn* [Leguminosae-Galegeae]; *M. pendulae*, Benth., affinis, floris vexillo ecalloso partibusque omnibus magis pubescentibus diversa.

Arbor magna, cortice laevi pallide brunneo. *Folia* 30–40 cm. longa, petiolo 4-plo longiora, rachi dense pubescente; stipulae ovatae, deciduae, 4 mm. longae; foliola bijuga, superiora lateralia late lanceolata, sensim acuminata, basi breviter acuminata, 14–17 cm. longa, chartacea, supra tenuiter, subtus dense molliter pubescentia, venis marginem approximantibus circiter 8-paribus; petioli 6–7 mm. longi; stipellae setaceae, 2–3 mm. longae. *Paniculae* racemiformes, erectae, terminales et laterales, 10–20 cm. longae, rachi pedicellis calycibusque dense breviter pubescentibus; nodi multiflori, 2–3 mm. longi. *Flores* congesti, 1–1·1 cm. longi; pedicelli 4–5 mm. longi; bracteae bracteolaeque minutae, deciduae. *Calyx* campanulatus, 5 mm. longus, dentibus triangularibus tubo bis brevioribus. *Petala* albo-flavida; vexilli lamina rotundata, basi subcordata, ecallosa; alae oblongae, basi truncatae, carinae paullo adhaerentes; carinae petala ovata, falcata. *Stamina* paullo perigyna, mona-

delpha, vexillari basi soluto. *Discus* nullus. *Ovarium* lineare, sericeum, 5-ovulatum. *Legumen* ignotum.

India. Burma: Pegu; Wunpeiu Reserve 150 m., *Lace* 6101.

Lace notes, "a tree 60 to 70 ft. high, attaining a girth of 8 ft. 6 in. (measured) at breast height. In mixed forest consisting chiefly of teak, pyinkada (*Xylia Kerrii*, Craib et Hutchinson) and bamboos. Wood used for handles of implements."

795. **Cotyledon paraguayensis,** *N. E. Brown* [Crassulaceae]; ex affinitate *C. californicae*, Baker, sed caulescens, foliis cuneato-obovatis, pedunculo ebracteato, corolla alba et staminibus reflexis facile distinguitur.

Herba succulenta, breviter caulescens. *Caulis* 1 cm. crassus, glaber. *Folia* alterna, conferta, superioribus rosulatis, sessilia, 4–7 cm. longa, prope apicem 2·5–4 cm. lata, cuneato-obovata, apice rotundata, brevissime cuspidata, glabra, pallide viridia, purpureo-tincta, glauca, nitida. *Pedunculi* ex axillis foliorum inferiorum enati, subhorizontaliter patuli, 5 cm. longi, nudi, glauci, apice cymoso-bifurcati, ramis 2–4·5 cm. longis simplicibus vel bifurcatis. *Bracteae* 5–8 mm. longae, 2·5–3 mm. latae, lanceolatae, acutae, supra planae, subtus valde convexae, adpressae, glabrae. *Pedicelli* 5–6 mm. longi, patuli, glabri. *Sepala* 5 mm. longa, 2·5 mm. lata, lanceolata, acuta, erecta, glabra, viridia, glauca. *Corolla* 1·5 cm. diametro; tubus 4 mm. longus, campanulatus, haud angulatus, pallide virescens; lobi 7 mm. longi, 3·5 mm. lati, valde patuli, ovato-lanceolati, acuti, plani, supra canaliculati, dorso obtuse subcarinati, albi, basi et margine minutissime purpureo-punctati. *Stamina* 10, primum erecta, demum recurvato-reflexa; filamenta alba; antherae rubrae. *Carpella* 5, leviter rubescentia.

Paraguay. Without precise locality, *F. Weinberg*.

Described from a living plant which flowered at Kew in April, 1914.

When the flower first opens, and during the shedding of the white pollen the stamens are erect, and the immature stigmas are closely connivent and not papillate. At about the third day the stamens become strongly recurved, or almost revolute, so that any remaining pollen is quite out of the reach of visiting insects and cannot be shed upon the stigmas, which now stand well apart and erect, with well developed whitish papillae.

796. **Sedum rariflorum,** *N. E. Brown* [Crassulaceae]; affinis *S. algido*, Ledeb., sed floribus laxissimis, sepalis patulis et petalis acuminatis aristato-apiculatis bene differt.

Herba perennis, succulenta. *Radix* crassa. *Caules* numerosi, annui, decumbentes, ad 15 cm. longi, 1·5 mm. crassi, glabri, apice laxe 2–3 ramosi; ramuli uniflori, laxe 4–5-foliati. *Folia* alterna, patula, 1·5–3·5 cm. longa, 2–2·5 mm. lata, linearia, acuta, supra plana, subtus leviter convexa, glabra, viridia, haud glauca. *Pedicelli* 0·3–1 cm. longi, glabri. *Sepala* patula, apice recurva, 5–7 mm. longa, linearia, acuta, glabra, viridia. *Petala* 5, libera, erecta, apice recurva, 1–1·1 cm. longa, 4 mm. lata, oblongo-lanceolata, acuminata, aristato-apiculata, glabra, alba. *Stamina*

10, petalis multo breviora, filamentis albidis, antheris rubris. *Carpella* erecta, staminibus subaequilonga, pallide virescentia.

China. Chihli: Hsiao Wutai Shan, 3000 m., *F. N. Meyer*.

Described from a living plant, sent by Mr. F. N. Meyer of the American Legation, Pekin, to Kew, where it flowered in June, 1914.

797. **Myrtus taxifolia,** *Ridley* [Myrtaceae-Myrteae]; *M. flavidae*, Stapf, affinis sed foliis multo angustioribus, innovationibus magis lanuginosis, floribus minoribus differt.

Frutex, ramis validulis apice simul ac foliis juvenilibus calycibusque dense lanuginosis. *Folia* lanceolata, apice obtusa, basi rotundata, 11 mm. longa, 2 mm. lata, coriacea, sicca atro-brunnea, superne laevia, polita, adulta glabra, costa supra depressa subtus cum nervis omnino obscura. *Flores* gemini, axillares, pedicellis brevissimis cum calycibus albo-lanuginosis. *Calyx* 3 mm. longus, tubo ovoideo, lobis 4 ovatis acutis utrinque lanuginosis. *Stamina* circiter 30. *Stylus* crassus, cylindricus, 5 mm. longus, stigmate minuto.

Borneo. Sarawak: Gunong Rumput, *J. Anderson* 188.

798. **Anaphalis Bournei,** *Fyson* [Compositae-Inuloideae]; *A. brevifoliae*, DC., arcte affinis sed foliis angustioribus longioribus, ramulis haud tam arcte adpressis et inflorescentiam prope magis distantibus differt; ab *A. neilgherriana*, DC., capitulis majoribus, indumento compactiore recedit.

Caulis fruticosus, inferne copiose ramosus, basi foliis marcidis reflexis tectus, simul ac partes reliquae plantae lana alba adpressa obtectus. *Folia* lineari-oblonga, acuta, 0·6–1·2 cm. longa, 1–2 mm. lata, in ramulis novellis inter se circiter 1 mm. distantia, primo erecta, mox divaricata, demum reflexa, in ramulis floriferis apicem versus magis distantia, internodiis supremis usque ad 1·5 cm. longis, costa conspicua, margine primo insigniter involuto. *Capitula* 1 cm. diametro, ramulis 18–22 cm. longis gracilibus gesta; involucri bracteae ovatae, acutae; receptaculum 3 mm. diametro, foveolatum.

South India. Pulney Hills, very common on the downs in dry and rocky places forming rounded humps like *A. Beddomei* and *A. travancorica*, *Bourne* 2696, *Fyson*. Nilgiri Hills, Kotagiri, *Wight*, K.D. 1630, Courtallam, *Wight*. Anamally Hills, *Wight*, K.D. 1630.

799. **Rhododendron Andersonii,** *Ridley* [Ericaceae-Rhodoreae]; inter species tubifloras *R. malayano*, Jack, affinis sed omnino majus, foliis rigide coriaceis latioribus recedit.

Frutex, ramis validulis, innovationibus lepidotis. *Folia* lanceolata, apice acuminata, acuta, basi cuneata, obtusa, 7–11 cm. longa, 1·5–4·5 cm. lata, rigide coriacea, supra glabra, laevia, nervis lateralibus utrinque 10–12 irregularibus pagina superiore depressis inferiore elevatis costaque prominente, dense lepidota, lepidibus orbicularibus in medio punctatis, petiolo crassiusculo 1 cm. longo suffulta. *Flores* 8, terminales, umbellati, bracteis pallidis subamplexicaulibus; pedicelli graciles, 1·5 cm. longi, lepidoti. *Calyx* discoideus, margine undulatus. *Corolla* tubulosa, 2·5 cm. longa, lobis obovatis rotundatis 1 cm. longis 7 mm. latis.

Stamina 10, glabra, corollae loborum medium vix superantia. *Stylus* cum ovario 2 cm. longus, lepidotus, haud pubescens; stigma parvum, obconicum.

Borneo. Sarawak: Gunong Rumput, *J. Anderson* 179.

The flowers appear to have been dark red.

800. **Echium Perezii,** *Sprague* [Boraginaceae-Borageae]; affine *E. Wildpretii*, H. H. W. Pearson, a quo thyrso laxo, cymis elongatis conspicue pedunculatis pedunculis bracteas aequantibus vel superantibus, corolla pallidiore, styli ramis longioribus, foliorum lamina usque ad basin decurrente distinguitur.

Planta erecta, circiter 2 m. alta. *Folia* iis *E. Wildpretii* similia, sed lamina usque ad basin decurrente, nervis lateralibus inferioribus costae subparallelis. *Thyrsus* laxus; cymae patulae, primum 7–8 cm. longae, sub fructu usque ad 35 cm. longae. *Corolla* dilute rosea. *Styli* rami circiter 1·8 mm. longi. *Nuculae* 2·8 mm. longae, 2·5 mm. latae, tuberculatae, rostro patulo.

Canary Islands. Palma: Punta Llana; Barranco del Agua. Nutlets of this species were collected by a goatherd for Dr. Elias Santos, who sent them to Dr. G. V. Perez of Tenerife. Plants raised from these nutlets flowered at Orotava during June-September, 1913, and were recognised as representing an undescribed species by Dr. Perez, who has sent notes, photographs, dried specimens and nutlets to Kew, where two plants flowered in June, 1914. The new species has been named in recognition of Dr. Perez's services to Canarian Botany generally, and to the study of the genus *Echium* in particular.

XXXVII.—NEW ORCHIDS; DECADE 42.

411. **Pleurothallis (Apodae caespitosae) Lankesteri,** *Rolfe;* affinis *P. myrianthae,* Lehm. et Kränzl., labello obovato-oblongo et atropurpureo differt.

Herba epiphytica, dense caespitosa, pusilla, circiter 6 cm. alta, caulibus secundariis subobsoletis. *Folia* petiolata; limbus elliptico-oblongus, minute tridenticulatus, 2–3 cm. longus, 7–9 mm. latus; petioli 1·5–2 cm. longi. *Racemi* fasciculati, breves, vix 1 cm. longi, multiflori. *Bracteae* distichae, subimbricatae, ovatae, acutae, concavae, 1 mm. longae. *Pedicelli* 3–4 mm. longi. *Flores* minuti. *Sepala* subpatentia, ovata, subacuta, 1·5 mm. longa; lateralia libera. *Petala* lanceolata, acuta, 1·5 mm. longa. *Labellum* obovato-oblongum, obtusum, carnosum, minutissime papillosum, 1 mm. longum. *Columna* lata, 0·5 mm. longa; stelidia late oblonga, patentia.

Costa Rica. Near Cachi, *E. Lankester.*

Flowered at Kew in June, 1914. It is very distinct from most others of the section, and closely resembles the Guatemalan *P. myriantha*, Lehm. et Kränzl., in habit, but differs in the shape and colour of the lip. It is very inconspicuous, owing to the fact that the small flowers are borne in fascicles below the leaves. The flowers are deep yellow, with the lip and column dark purple.

412. **Microstylis Andersonii,** *Ridley*; herba *M. bancanae*, Ridley, affinis, labello oblongo, lobo terminali bifido, fovea nulla distincta.

Caulis adscendens, 7–14 cm. longus. *Folia* herbacea, lanceolata, acuminata, basi angustata, obliqua, 13 cm. longa, 4 cm. lata vel minora, 5-nervia; petiolus 1·5 cm. longus. *Scapus* gracilis, 19 cm. longus, basi (11 cm.) nudus. *Racemus* laxus, pauciflorus. *Bracteae* lanceolatae, acutae, deflexae, 2 mm. longae; pedicelli graciles, 3 mm. longi. *Flores* parvi, pallidi, 3 mm. longi. *Sepalum* posticum lanceolatum, cymbiforme, acutum; lateralia latiora, breviora, obtusa. *Petala* lateralia oblongo-linearia, obtusa, angusta. *Labellum* oblongum, quadratum, lobo terminali ovato bifido, lobis lateralibus incurvis brevibus, auriculis majusculis falcatis lanceolatis obtusis, fovea nulla, nervis in medio elevatis. *Columna* subelongata, stelidiis prominulis erectis obtusis, anthera brevi lata reniformi.

Borneo. Sarawak: Bau, *J. W. Anderson* 42.

413. **Sarcopodium suberectum,** *Ridley; S. acuminato*, Rolfe, affine, sed minus, labelli epichilio subcarnoso, carinis rugosis pubescentibus, foliis multo minoribus ellipticis obtusis valde coriaceis.

Caulis adscendens, ramosus, validulus, lignosus, 16 cm. altus, radicibus longis crassis. *Pseudobulbi* conici, 4-angulati, obtusi, 3 cm. longi, sicco ad basem 1 cm. diametro. *Folia* elliptico-lanceolata, apice obtusa, minute inaequaliter biloba, basi angustata, 4·5 cm. longa, 1·5 cm. lata, rigide coriacea, polita, supra tenuiter striata, subtus laevia, carinata, petiolo 1 cm. longo suffulta. *Racemus* flexuosus, 8 cm. longus, floribus 4; bracteae oblongo-lanceolatae, obtusae, 4 mm. longae; pedicelli graciles, 1·7 cm. longi. *Sepala* lanceolata, acuminata, lateralia mentum breve 5 mm. latum obtusum formantia, 1·7 cm. longa, 6-nervia. *Petala* lanceolata, acuminata, acuta, fere aequilonga, 6-nervia. *Labellum* trilobum, 1·5 cm. longum, lobis lateralibus oblongis apice rotundatis, epichilio ovato-lanceolato acuto subcarnoso, carinis 2 ad basem elevatis et incurvis nectarium tubiforme formantibus, in epichilio carinis undulatis rugosis pubescentibus. *Columna* elongata, ad pedis apicem alata, ventrice tristriata clinandrio profundo margine trilobo lobis subtriangularibus, antheris sterilibus 2, mediana fertili conica. *Capsula* subgracilis, cylindrica, 2·5 cm. longa, columna terminata.

Borneo. Sarawak: Gunong Rumput, *J. W. Anderson* 172.

The column in the only flower in good condition has two rudimentary anthers attached to processes of the margin of the clinandrium just as in *Dendrobium pandaneti*, Ridley. This may be an accidental monstrosity or a normal occurrence as in the last-mentioned plant.

414. **Coelogyne annamensis,** *Rolfe*; affinis *C. brunneae*, Lindl., sed pseudobulbis fusiformibus, floribus minoribus, et labello inaequaliter tricarinato differt.

Pseudobulbi crasse fusiformes vel fusiformi-oblongi, circiter 9 cm. longi, 3 cm. lati, leviter sulcati, diphylli. *Folia* breviter petiolata, elliptico-oblonga, acuta, subundulata, 5-nervia, 20 cm. longa, 5·5 cm. lata. *Scapus* arcuatus, circiter 25 cm. longus, 8-florus. *Bracteae* elliptico-oblongae vel ovato-oblongae, valde concavae, 2·5–3·5 cm. longae. *Pedicelli* 1·5–2·5 cm. longi.

Sepalum posticum elliptico-oblongum, subobtusum, concavum, incurvum, 3·5 cm. longum, 1·4 cm. latum; sepala lateralia oblonga, subacuta, carinata, subpatentia, 2·5–3 cm. longa, 1 cm. lata. *Petala* linearia, acuta, recurva, circiter 3 cm. longa. *Labellum* trilobum, recurvum, 2·5 cm. longum; lobi laterales oblongi, obtusi vel subobtusi; lobus intermedius obovatus vel orbiculari-obovatus, obtusus, 1·5 cm. latus; discus obtuse tricarinatus, carinis nanis laevibus valde inaequalibus. *Columna* incurva, clavata, 2 cm. longa.

Annam.

Flowered in the Royal Botanic Garden, Glasnevin, in November, 1913, when it was sent to Kew for determination with the record that it was obtained from Messrs. Sander and Sons, in June, 1912. It is a member of the small group *Fuscescentes*, but is distinct from the species already known. The sepals and petals are pale buff yellow, and the lip rather darker, with irregular radiating brown nerves on the side lobes, some orange-brown on the lower part of the front lobe, and flesh-coloured keels.

415. **Eulophia Lambii,** *Rolfe; E. Kirkii*, Rolfe, simillima, sed labello latiore et ob discum prominenter 5-carinatum prope apicem cristato differt.

Folia oblongo-lanceolata, acuminata, plicata, membranacea, 5-nervia, 13–17 cm. longa, 1·5–3 cm. lata. *Scapi* 20–30 cm. alti, vaginis spathaceis acutis 3·5–4 cm. longis obtecti; racemi 9–11 cm. longi, compacti, multiflori. *Bracteae* lineari-lanceolatae, acuminatissimae, circiter 2 cm. longae. *Pedicelli* 1–1·3 cm. longi. *Flores* mediocres. *Sepala* subpatentia, oblongo-lanceolata, acuta, brunnea, 1·7–2 cm. longa. *Petala* suberecta, ovato-oblonga, obtusa, flava, circiter 1·5 cm. longa. *Labellum* trilobum, 1·2 cm. longum, 1 cm. latum; lobi laterales oblongi, obtusi, subundulati; lobus intermedius orbiculari-oblongus, obtusus, valde undulatus; discus prominenter 5-carinatus, carinis basi verruculosis apice elevatis incrassatis et cristatis; calcar conico-oblongum, obtusum, incurvum, 3 mm. longum. *Columna* clavata, 7 mm. longa.

Tropical Africa. Northern Nigeria: Bauchi Plateau, *P. H. Lamb*.

This species closely resembles the Eastern *E. Kirkii*, Rolfe, in general appearance, but is markedly different in the details of the lip. It is dedicated to Mr. P. H. Lamb, Director of Agriculture in Northern Nigeria, who collected it together with other interesting plants.

416. **Eulophia pusilla,** *Rolfe:* ab *E. Milnei*, Reichb. f., calcare oblongo et labello aequilongo valde differt.

Folia non vidi. *Scapi* erecti, subgraciles, 30–37 cm. alti, basi vaginis tubulosis obtecti; racemi 5–7 cm. longi, sublaxiflori, multiflori. *Bracteae* oblongo-lanceolatae, breviter acuminatae, concavae, 3 mm. longae. *Pedicelli* subgraciles, 6 mm. longi. *Flores* parvi. *Sepala* subpatentia, circiter 5 mm. longa; posticum elliptico-oblongum, subacutum; lateralia oblongo-lanceolata, subacuta. *Petala* elliptico-oblonga, subacuta, 4–5 mm. longa. *Labellum* trilobum, 3·5 mm. longum; lobi laterales semioblongi,

angulati vel subtruncati; lobus intermedius rotundatus, obtusus, crenulatus; discus crebre papilloso-cristatus; calcar oblongum, subobtusum, 4 mm. longum. *Columna* oblonga, 2·5 mm. longa.

Tropical Africa. Gold Coast Colony: Eastern Province; open country on Afram Plains, *K. G. Burbridge* 245.

The plant is said to grow on dry poor soil, exposed to full sunshine, and the flowers are white, tinged with yellow.

417. **Maxillaria Fletcheriana,** *Rolfe;* a *M. Hubschii,* Reichb. f., partibus omnibus fere duplo majoribus et floribus purpureo-striatis differt.

Pseudobulbi ovoideo-oblongi, subcompressi, 3–5 cm. longi, apice monophylli, basi diphylli. *Folia* petiolata; limbus oblongus vel elliptico-oblongus, subacutus, 15–20 cm. longus, 4·5–5·5 cm. latus; petioli 8–12 cm. longi, vaginis late conduplicatis. *Scapi* 30–32 cm. longi, vaginis oblongo-lanceolatis acutis conduplicatis imbricatis obtecti. *Bracteae* elliptico-lanceolatae, acutae, subconduplicatae, 5·5–6 cm. longae. *Pedicelli* 5 cm. longi. *Flores* speciosi. *Sepalum* posticum ovatum, subacutum, obtuse carinatum, concavum, 4 cm. longum, 2·2 cm. latum; sepala lateralia oblique triangularia, subacuta, 3 mm. lata, apice subrecurva, basi in mentum obtusum subincurvum 4 mm. longum extensa. *Petala* elliptico-ovata, breviter acuminata, basi incurva, apice recurva, 3 cm. longa, 1·5 cm. lata. *Labellum* recurvum, elliptico-obovatum, trilobum, 4–5 cm. longum; lobi laterales obtusissimi, erecti; lobus intermedius suborbicularis, obtusus, undulatus, 1·5 cm. latus; callus obovato-oblongus, obtusus, crasse carnosus. *Columna* crassissima, 1·5 cm. longa, pede 4 cm. longo.

Peru. *L. Forget.*

Introduced by Messrs. Sander and Sons, and flowered in their establishment at St. Albans in April, 1913, when it received an Award of Merit from the Royal Horticultural Society. The sepals are white, with a few irregular purple lines, the petals more strongly lined, and the lip yellow in front with a few purple dots, the crest yellow, and the side lobes suffused and lined with red-purple.

418. **Renanthera pulchella,** *Rolfe*; a *R. Imschootiana,* Rolfe, floribus duplo minoribus, labelli lobo intermedio orbiculari-ovato et colore florum differt.

Herba epiphytica, circiter 18 cm. alta. *Folia* disticha, anguste oblonga, apice breviter biloba, coriacea, 6·5–8 cm. longa, 1·5–2 cm. lata. *Scapi* patentes, circiter 18 cm. longi, parce ramosi. *Bracteae* ovatae, obtusae, concavae, 3 mm. longae. *Pedicelli* circiter 1 cm. longi. *Flores* mediocres. *Sepalum* posticum oblongo-lanceolatum, obtusum, 1·3 cm. longum; sepala lateralia spatulata; limbus elliptico-oblongus, obtusus, subundulatus, 1·3 cm. longus, 8 mm. latus; unguis 4 mm. longus. *Petala* subspatulato-oblonga, obtusa, 8 mm. longa. *Labellum* trilobum, 5 mm. longum; lobi laterales triangulares, obtusi, subcarnosi, 2 mm. longi et lati; lobus intermedius ovato-orbicularis, 4 mm. latus, basi prominenter quadridentatus. *Columna* lata, brevissima.

Burma.

Flowered in the establishment of MM. A. A. Peeters et Cie, Brussels, in August, 1913. A single plant appeared in an importation of *R. Imschootiana*, Rolfe, to which it bears a general resemblance in habit, but the flowers are only about half as large and markedly different in structure. The colour is yellow with the side lobes of the lip and upper half of the petals crimson.

419. **Angraecum birrimense,** *Rolfe*; ab *A. Eichleriano*, Kränzl., floribus minoribus, labello angustiore et calcare recto differt.

Herba epiphytica. *Caulis* subelongatus. *Folia* disticha, oblonga vel elliptico-oblonga, oblique bidentata, 10–13 cm. longa, 2·5–3·5 cm. lata. *Scapos* non vidi. *Flores* speciosi. *Pedicelli* 3·5 cm. longi. *Sepala* et *petala* subpatentia, lineari-lanceolata, acuminata, 3–3·5 cm. longa, 5–8 mm. lata. *Labellum* obovatum, apice triangulari-acuminatum, 2·5 cm. longum et latum; calcar leviter curvatum, 3·5 cm. longum, basi infundibulare, deinde subconstrictum et subclavato-cylindricum. *Columna* latissima, 4 mm. longa; pollinarii glandula squamiformis.

Tropical Africa. Gold Coast: Birrim District, in dense forest, *A. G. Miles*.

A living plant and a somewhat imperfect dried specimen were sent to Kew, and the latter is now in the collection. Although near to *A. Eichlerianum*, Kränzl., the lip is not broadly dilated at the sides, and the upper part of the spur is narrower and less obliquely bent about the middle than in that species.

420. **Disa (Eudisa) nigerica,** *Rolfe*; habitu *D. saxicolae*, Schlechter, sed sepalo postico patente, calcare apice incurvato-clavato, et labello latiore differt.

Herba terrestris, circiter 22 cm. alta. *Folia* caulescentia, sessilia, oblongo-lanceolata, acuminata, 3–4 cm. longa, circiter 8 mm. lata. *Racemus* circiter 9 cm. longus, sublaxus, multiflorus. *Bracteae* lanceolatae vel oblongo-lanceolatae, acutae, 5–8 mm. longae. *Pedicelli* 0·8–1 cm. longi. *Flores* parvi, purpurei. *Sepalum* posticum patens, ovatum, subacutum, 4 mm. longum; calcar erectum, 7 mm. longum, basi conicum, deinde gracile, apice incurvo-clavatum; sepala lateralia patentia, ovato-oblonga, subacuminata, 6 mm. longa. *Petala* dolabriformia, 3 mm. longa, apice 2 mm. lata. *Labellum* spatulatum, obtusum, integrum, 4 mm. longum, 1·5 mm. latum. *Anthera* reclinata.

Tropical Africa. Northern Nigeria, *R. G. P. Nelson* 5.

Closely resembling *D. saxicola*, Schlechter, in habit, but markedly different in the shape of the dorsal sepal and lip. The flowers are described as purple.

XXXVIII.—WEST INDIAN BOXWOOD.

(*Casearia praecox*, Griseb.)

T. A. Sprague and L. A. Boodle.

The botanical identity of the tree yielding the wood known in the trade under the name of West Indian or Venezuelan boxwood

has for a long time been a matter of doubt. Since the year 1910 H.M. Minister at Caracas, Venezuela, and H.M. Consuls at Puerto Cabello and Maracaibo have been unremitting in their efforts to obtain herbarium specimens and corresponding samples of the timber of Venezuelan boxwood on behalf of the Royal Botanic Gardens.

In the year 1911 in reply to our request for specimens of the tree yielding West Indian boxwood H.M. Minister at Caracas kindly forwarded some specimens of wood with the following information supplied by Mr. Vice-Consul Schröder of Maracaibo:—

"The West Indian boxwood is a product of the district of Maracaibo only and therefore exported only from here. If at any time the genuine boxwood has been shipped from Curaçao or Puerto Cabello, it had been originally shipped from Maracaibo. The boxwood is a yellowish hard wood used mostly for turning. It is cut in pieces about two yards long and from 4–8 inches thick. The best time for cutting the wood is during the months of December to June."

Mr. Schröder promised in the course of his despatch to send herbarium specimens in addition to the samples of wood, but it was not until May of this year that specimens of branches with leaves and flowers of the boxwood tree, together with pieces of the wood were received at Kew. Our best thanks are due to H.M. Minister at Caracas for his kind help, and especially to Mr. Vice-Consul Schröder for the keen interest he has taken in this matter.

The Tree.—The abundant supply of flowering and leafy twigs has enabled the Maracaibo boxwood tree to be identified as *Casearia praecox*, Griseb.,* a species hitherto recorded only from Cuba.

C. praecox has been collected, however, in the district of Santa Marta, Colombia, by Mr. H. H. Smith, No. 789, distributed as "*Casearia ramiflora*, Vahl (?)."

The genus *Casearia* was assigned by Bentham and Hooker† to the family *Samydaceae*, which is merged by Engler and Prantl‡ in the *Flacourtiaceae*. The leaves of most species show pellucid dots and dashes when held up to the light, owing to the presence of secretory cavities in the mesophyll. These cavities are present in the leaves of *C. praecox*, but are rather small, and hardly visible in a dried state owing to the opacity of the leaves, and were overlooked by Grisebach. The sepals of *C. praecox* exhibit refracting dots due to the presence of secretory cavities. According to Eichler§, the sepals are less frequently dotted in species of *Casearia* than the leaves.

The flowers of *Casearia* are apetalous, with 4–6 sepals, and 6–12 stamens alternating with the same number of staminode-like bodies. The latter are considered by some authors as

* Cat. Pl. Cub. p. 10 (1866).
† Genera Plantarum, vol. i. p. 796.
‡ Nat. Pflanzenfam. vol. iii. 6. A. p. 50.
§ Mart. Fl. Bras. vol. xiii. part 1, p. 458.

staminodes, and by others as disc-processes. The ovary is unilocular with three (rarely two) parietal placentae, and bears a single style.

The genus has been divided into several sections based on the nature of the style and the disc-processes. The section *Crateria*, to which *Casearia praecox* belongs, is characterised by a trifid style with capitate stigmas, and by the disc-processes being free, and inserted in the same circle as the stamens. Three other species of this section are known: one, *C. sylvestris*, Sw., very widely distributed in tropical America, and two, *C. inaequilatera*, Camb., and *C. Selloana*, Eichl., natives of Brazil.

C. praecox may be distinguished by its ash-coloured branches and twigs, leaves hairy on the midrib beneath and without obvious markings in a dried state, and well marked "spurs" (short shoots), which bear the fascicles of flowers. These "spurs" have the shape of a shallow stalked cup, the stalk being much flattened parallel to the branchlet which bears it. Combs, who collected the species in the Cienfuegos district of Cuba, described it as a shrub 2–3 m. high.* In Maracaibo it attains the dimensions of a tree; its height is not stated, but a section of a trunk received from Mr. Schröder is about 25 cm. in diameter.

The bibliography and geographical distribution of *C. praecox* are as follows:—

C. praecox, *Griseb.*, Cat. Pl. Cub. p. 10 (1866); Warb. in Engl. u. Prantl, Nat. Pflanzenfam. vol. iii. 6. a. p. 52; Combs in Trans. Acad. Sc. St. Louis, vol. iii. p. 423.

Cuba. Western part of the island, *Wright* 1889; Matanzas, *Rugel* 206; district of Cienfuegos, in rocky woods, on fertile soil at Cienaguita, fl. Feb., *Combs* 704. Colombia. Santa Marta, 45 m., fl. March, H. H. Smith 789. Venezuela. Maracaibo district, fl. March–April, per *F. J. Schröder*.

The geographical distribution, Cuba and South America, is interesting. It is an additional illustration of Engler's statement that most of the plants common to the West Indies and cisequatorial South America occur on the Greater Antilles.† According to Urban‡ the flora of Puerto Rico exhibits very strong relationships with that of South America; and by far the greatest part of the high mountain flora of Santo Domingo consists half of new species, and half of continental species which occur nowhere in the West Indies except at high levels in Santo Domingo.§

It may be useful to mention some minor differences which have been noticed in the specimens of *C. praecox* from different localities.

Cuba (*Combs* 704). Pedicels 4–5 mm. long; staminodes 0·8 mm. long; style altogether 1 mm. long, the undivided part twice as long as the arms; ovules 13–15; leaves long and gradually acuminate, acute or obtuse at the base.

Venezuela (*Schröder*). Pedicels 4–5 mm. long; staminodes

* Trans. Acad. Sc. St. Louis, vol. vii. p. 423 (1897).
† Versuch einer Entwicklungsgeschichte der Florengebiete, vol. ii. p. 212.
‡ Symbolae Antillanae, vol. iv. p. 681.
§ Symbolae Antillanae, vol. vi. p. 291.

0·5 mm. long; style altogether 0·6–0·75 mm. long, the undivided part as long as the arms, rarely twice as long; ovules 15–18; leaves long and gradually acuminate, acute, obtuse or rounded at the base.

Colombia (*Smith* 789). Pedicels 7 mm. long; staminodes 0·8 mm. long; style altogether 1·1–1·3 mm. long, the undivided part two to three times as long as the arms; ovules 21–23; leaves shortly acuminate or cuspidate, obtuse or rounded at the base.

It will be seen that the Venezuelan plant has shorter staminodes and style than the Cuban or Colombian specimens, and that it usually has the undivided part of the style no longer than the style-arms. In the length of the pedicels, however, it agrees with Cuban specimens, and in the number of ovules it is intermediate between the Cuban and the Colombian. The shape of the leaves is rather variable. It is evident that, on the characters given above, it is undesirable to separate the Cuban, Venezuelan and Colombian plants, even as distinct varieties.

The Wood.—As the twigs which bore the leaves and flowers were separate from the samples of wood, it was thought advisable to compare the microscopic structure of the twigs with that of the wood-specimens, in case there should have been any mistake on the part of the collector. The result of the comparison is quite satisfactory as regards agreement in structure, and proves that the twigs and wood belong to the same species, or to two closely related species. Under the circumstances they may be accepted as belonging to the same species.

The specimens of wood referred to are a small block and a section of the stem (or short log with bark) about 12 inches in diameter and $2\frac{1}{2}$ inches thick. The wood is close-grained and yellowish, and bears a considerable resemblance to true boxwood. The presence of a secretion in the inner bark (secondary bast) is indicated in the log by a resinous or oily stain on the transverse surface. The secretion has oozed out of the bark, and has then soaked into the peripheral part of the wood, so that the stain extends a short distance (1–3 mm.) on either side of the cambium.

The structure of the wood is as follows. The vessels are small, rounded or elliptical (with greater diameter usually less than 50 μ), solitary or in short radial rows, fairly evenly distributed, and numerous, *e.g.*, 240 to the square millimeter. The perforations of the vessels are simple. The pits between the vessels and the medullary ray-cells are small and bordered, like those on the other parts of the walls of the vessels. The medullary rays are numerous; some are uniseriate, but most are multiseriate, being usually three or sometimes four cells broad in their middle region. Many of the multiseriate rays have an upward or downward uniseriate prolongation of considerable length (as seen in tangential section). The cells in the multiseriate portion are mostly rounded, and 10–15 μ in diameter, while the cells of the uniseriate part are quadrangular, and may measure from 25 to 60 μ by 12 to 18 μ. Solitary crystals of oxalate of lime occur in many of the cells of the uniseriate portions of the rays. The height of some of the medullary rays is rather more than 1 mm.

Wood-parenchyma appears to be quite absent. The wood-fibres have thick walls and simple pits. The length of the fibres averages rather less than 1 mm., and their diameter 15–20 μ.

The bark of the specimen is about 4 mm. thick. The cork-cells are thickened on the inner side, and their cavities become nearly or quite obliterated. The secondary phloem includes secretory canals and stone-cells, but no sclerenchyma-fibres. The secretory canals may reach 50 μ in diameter, but are mostly smaller; they have a distinct thin-walled epithelium, and their contents are soluble in alcohol. The stone-cells in the older parts of the secondary phloem form continuous or nearly continuous zones alternating with soft tissue. In the younger phloem the stone-cells may first appear in rounded groups or tangential bands, which afterwards become united. Numerous cells containing solitary crystals of oxalate of lime become included in the bands of stone-cells.

There seems to be no reason to doubt that the specimens of West Indian Boxwood mentioned above belong to the same species of tree as do the branches bearing flowers and leaves, and should be referred to *Casearia praecox*, Griseb.

Though Solereder* does not mention the occurrence of secretory canals in *Casearia*, or in any other member of the family to which *Casearia* belongs (*i.e.*, *Samydaceae* of Bentham and Hooker, or the corresponding portion of *Flacourtiaceae* of Engler and Prantl), he states that he found secretory cavities in the phloem of one species, viz., *Casearia grandiflora*. Van Tieghem,† moreover, in describing the secretory cavities of the *Samydaceae*, states that in the stem (in *Samyda*) they are more or less strongly elongated, and resemble secretory canals. From these statements it appears probable that the secretory canals found in the specimens under consideration are not altogether exceptional for the *Samydaceae*; at any rate the phloem of one other species of *Casearia*, viz. *C. tomentosa*, Roxb., possesses secretory canals like those of *C. praecox*.

The samples of wood from the Maracaibo district appear to be identical with several specimens of West Indian Boxwood in the museum at Kew. Two of these are pieces prepared for wood-engraving, and presented by Mr. R. J. Scott, of 8, Whitefriars, E.C., one in 1867, the other in 1880. The latter bears a note that the donor reported on this wood: "It is the only likely successor to boxwood I have yet seen." The other specimens are as follows. A block of wood, a rough and a finished stick and handle for a sunshade presented by Messrs. Henry Howell and Co., 180, Old Street, E.C., in 1888; a butter-clapper ("Scotch hand") made at Chesham (Mr. James Howard, Chesham, 1889); a section of the stem from Maracaibo (Messrs. Joshua Gardner and Sons, 1909); two samples of Venezuelan Boxwood sent by H.M. Minister at Caracas in 1912; and a number of specimens illustrating the manufacture of butter-clappers, etc., presented in 1912 by Messrs. Thomas Wright and Sons, Steam Mills, Chesham, where the articles were made.

* Solereder, Syst. Anat. of Dicotyledons (Eng. edition), vol. 1, p. 377.

† Van Tieghem, Canaux Sécréteurs des Plantes, Annales des Sci. Nat. Bot. 7 sér. t. 1, p. 59.

The earlier of these specimens were originally named *Tabebuia pentaphylla*, Hemsl., but the identity of the wood had been regarded as doubtful for some years past.

Wiesner* gives a description of the structure of a West Indian Boxwood, which appears to be the same as the one described here, and therefore the wood of a species of *Casearia*. He, however, gives the botanical name of the tree yielding the wood as *Aspidosperma Vargasii*, DC. on the authority of A. Ernst,† who mentions that the wood is called "Amarilla yema de huevo"‡ in Venezuela. Ernst also refers to the export of the wood from Puerto Cabello to Hamburg, and gives figures showing that the export was considerable in 1878. Wiesner mentions that the wood is used for making shuttles, combs, sticks and measures, but states that it is less suitable for wood-engraving.

Useful wood is yielded by other species of *Casearia*, and in the case of *C. tomentosa*, Roxb. the wood is employed for making combs.§ A specimen in the museum at Kew shows that the grain of this wood is not so close as in West Indian Boxwood, but it is quite possible that there may be two or more species of *Casearia* in America yielding woods that are practically indistinguishable. For the present, however, it may be assumed that the different specimens of West Indian or Venezuelan Boxwood referred to above belong to the same species.

XXXIX.—THE JAPANESE SEAWEED, TOSAKA NORI.

A. D. Cotton.

Some years ago Mr. E. M. Holmes presented to the Herbarium some specimens of an edible Japanese alga which he had received from the late Mr. E. C. C. Stanford. The plant is much esteemed in Japan where it is known as *Tosaka nori* (=Cock's-comb seaweed). The structure of the thallus and cystocarp was plainly that of *Eucheuma*, though the outline of the frond agreed with none of the described species of that genus. Being apparently common in Japan, it was improbable that it had never been named, hence, pending further inquiry, the plant was laid in the Herbarium as *Eucheuma* sp. Mr. Holmes also had been unable to place it under any described species.

Identification and Description.—On the occasion of Professor Yendo's visit to England last winter, the opportunity was taken to ask his opinion. Dr. Yendo's knowledge of the algae of the East is unrivalled, not only from the fact that he has for many years made an exceptionally careful study of the algal vegetation of Japan, but also from the circumstance that he had just com-

* Wiesner, Die Rohstoffe des Pflanzenreiches, vol. 2, p. 999.

† A. Ernst, Bot. Centralblatt, 1 Jahrg. (1880), p. 59.

‡ The name refers to the colour of the wood, which is supposed to resemble that of the yolk of an egg.

§ Watt, Dict. Econom. Prod. of India.

pleted a two years' tour of the principal herbaria of Europe in order to examine the specimens on which the Japanese species had been founded or recorded. "Tosaka" was familiar enough to Prof. Yendo, who stated that its scientific identity had never been effected in Japan, but that in his "Text Book of Marine Botany" he had provisionally and doubtfully referred the plant to *Meristotheca papulosa*, though it differed materially from the description of that species. During his stay in Europe he had found specimens of the plant in question in many herbaria, and under various names. The examination, however, of the co-types at Dublin and Lund did much to remove the doubt expressed in his text-book, and on returning to the Continent in February, Dr. Yendo wrote that he had clinched the point by an examination of Montagne's original specimen in the Paris Museum. As this is now established, and as it is unlikely that any earlier specific name for the plant will be discovered, the new combination *Eucheuma papulosa* may be formed, the formal description of which is as follows:—

Eucheuma papulosa, Cotton et Yendo, comb. nov., *Callymenia papulosa*, Mont. Pugillus Alg. Yemens No. 21 (Ann. Sci. Nat. ser. 3. t. xiii, 1850, p. 246); J. Ag. Sp. ii. p. 293. *Euhymenia papulosa*, Kütz. Tab. Phyc. xvii. Tab. 73, fig. 2. *Meristotheca papulosa*, J. Ag., Bidrag Fl. Syst. p. 36, partim, excl. syn.; Yendo, Text-book of Marine Botany pp. 622-630, figs. 177 and 178.

Fronds springing from a discoid base, with a short stem soon expanding and dividing into many segments. Total height, 15–20 cm., very irregular in general outline but cordate or reniform when fully developed. Colour when fresh deep rosy brick red. Segments plane, thick and fleshy, 5–8 cm. long, 2–5 cm. wide, irregularly dichotomous: margins at first entire, later giving rise in a pectinate manner to copious proliferating branchlets. Antheridial and cystocarpic plants usually rugulose on the surface. Cystocarps sessile, globose, intermixed with short subulate processes, marginal, or in irregular clusters on surface. Antheridia similar in shape and in position to cystocarps but destitute of subulate outgrowths. Tetraspores scattered all over the frond, imbedded in the epidermal layer, zonately divided, small, 18–20 × 9–10 μ.

Distribution.—Red Sea, Somaliland, Formosa, Japan, Guadeloupe (?), Sandwich Islands.

The external appearance of the plant is extremely variable according to the age and mode of branching. In the simpler forms the frond is flat, dividing into broad linear segments with wide axils; in the more complicated, the general aspect resembles that of *Halymenia formosa*. The surface of the principal segments of sexual plants is usually rugulose and the margin verrucose and irregular owing to the presence of reproductive bodies. The tetrasporic form has a smooth surface and is generally more copiously branched. In some specimens the frond is spotted with deep crimson flecks and in others it is homogenously crimson red. The subulate processes amongst the cystocarps are characteristic of the species, though they occur also in a doubtful ally *E. Schrammii*, J. Ag.

History and Taxonomy.—The original specimen of *Callymenia papulosa* is represented in Montagne's Herbarium at Paris by a tetrasporic plant, but there are co-types at Dublin and Lund which possess cystocarps. It is fortunate that both forms of fruit are available, as it was only by means of these that the true position of the plant could be located. Dr. Yendo found that the structure of the frond and cystocarp of the Dublin specimen was clearly that of a *Eucheuma*. A difficulty, however, existed as to the tetraspores. In *Eucheuma* these are zonate. J. Agardh in 1872 removed *C. papulosa* to his genus *Meristotheca*, a genus which he expressly separates from other members of the *Solierieae* on the ground of cruciate tetraspores. He gave as a synonym *Halymenia ceylanica*, Harv. and *Callymenia exasperata*, Zan. J. Agardh's material at Lund was examined by Yendo, who reports that he had no doubt that the statement as to the tetraspores was not based on an authentic specimen, but on some other species. Nine specimens so named exist in the Agardhian Herbarium, and they comprise at least three species. In any case, the possession of cruciate tetraspores is negatived by the fact that in the type specimen at Paris the sporangia are zonate. Montagne's species is thus shown to be a typical *Eucheuma*, and from wide experience of the Japanese Tosaka, both in the field and in herbarium, Yendo has no hesitation in referring it to that species. It may be added that specimens from Japan sent by Tanaka to Grunow (now in the herbarium of the Botanical Museum at Berlin) were identified by the latter as *Meristotheca papulosa*, but this fact was never communicated to Japanese algologists.

The subsequent history in the literature of Montagne's plant may be briefly stated. Heydrich, in his paper on New Guinea Algae (Ber. Deut. Bot. Ges. x. p. 477, 1892), takes up Harvey's *Halymenia ceylanica* (Kütz. Tab. Phyc. xvi. Tab. 97) and formed the combination *Sebdenia ceylanica*, Heydr. Under this he places *Meristotheca papulosa* (Mont.) J. Ag., as a synonym, a position in which it unfortunately finds itself in De Toni's Sylloge Algarum. Without re-investigation, which in so vast a work was impossible, it was only natural for De Toni to leave the plant where Heydrich placed it, but it is needless to say that as a *Eucheuma* it has been practically buried. Harvey's *Halymenia ceylanica* is itself a problem, and is probably a composite gathering, but there is no evidence that it is allied to *Eucheuma*.

The following extracts compiled from Prof. Yendo's note-book are worth recording:—

"During my stay in Europe I found the plant treated in a puzzling way and under many diverse names. In addition to finding specimens named *Meristotheca papulosa*, I discovered specimens under:—

Sarcodia Klenzeana (Kütz.) Kjellm.	Hb. St. Petersburg. det. Kjellman.
Callymenia dentata, Kütz.	Hb. Imp. Mus. Tokyo. det. Grunow.
Acanthymenia Harveyana, J. Ag.	Hb. Bot. Mus. Lund. Sandwich specimen only. det. J. Agardh.

Eucheuma Schrammii, J. Ag.	Hb. Bot. Mus. Lund. Guadeloupe specimen only. det. J. Agardh.

"The following other more or less doubtful references to the plant occur in the literature or herbaria. A name *Tosakanoria japonica* is mentioned in a list of Japanese plants compiled by K. Saida (1910) without description, but with little doubt proposed for this same plant. Being a *nomen nudum*, however, it is not valid. The alga distributed by Collins, Setchell and Holdens in Phyc. Bor. Amer. No. 745 under *Eucheuma echinocarpum*, Aresch. has some resemblance to Tosaka, but it differs in several particulars. It should be further noted that in the copies of Phyc. Bor. Amer., which I have seen, the Florida plant is distinct from the original *E. echinocarpum* of Areschoug. The alga hinted at as gen.? sp.? in Okamura's Nippon Sorui Mei-i (Enumeration of the Algae of Japan, 1902) certainly refers to our Tosaka. The nearest ally is *Eucheuma Schrammii*, J. Ag., which was originally distributed by Mazé as *Mychodea Schrammii*, Orn. I have examined specimens at Kew, Dublin and Lund, all of which are fragmentary, and though they agree in possessing horned cystocarps it is impossible to say from the specimens whether or not they are identical with *E. papulosa*. The colour and texture do not support such a view."

Habitat and Economic Importance.—The following notes have also been supplied by Prof. Yendo. Tosaka is often collected by divers in a depth of 10–12 fathoms in open coasts in the middle and southern part of the country. Large quantities of the plant are, however, obtained by picking up the floating fronds with scoop-nets after rough weather in early spring. It is found on the Pacific side of Japan up to about 36° N., and is supposed to grow in much deeper water than the above-mentioned depth.

The collected weed is dried in the sun and sold in the markets, where several varieties, according to the colour, substance and shape, are distinguished by dealers. It is prepared into isinglass and is used as food. A certain amount is also exported annually to China where the plant is known as Hong-tsay (crimson-weed).

XL.—THE RINGING OF TREES.

L. A. Boodle.

The injuries sometimes inflicted on trees by squirrels were described a few years ago in the case of young trees of *Thuya* and *Cupressus*, specimens of which had been sent to Kew by Mr. R. B. Rogers, of Hexworthy, Launceston, Cornwall.* The immediate injury is to the bark,† which is stripped off the trunk in places, sometimes on one side, sometimes all round. That is, in the latter case the stem is completely ringed, and an experiment

* A. W. Hill, Conifers damaged by squirrels. New Phytologist, vol. 10, pp. 340–342, Pl. 7.

† The word "bark" is used here for convenience in the vernacular sense to include all the tissues outside the wood (or outside the cambium).

in plant-physiology is the outcome of the squirrels' labour. In the examples referred to the damage had been very severe; long strips of bark had been removed, so that in one case a considerable portion of the trunk appeared as a pole of bare wood with islands of bark upon it. Branches of the stem inserted within some of these islands were still living, and bore healthy foliage, although their isolation by the removal of the bark from around the islands had taken place more than two years previously.

Some further specimens injured in a similar manner have recently been received from the same donor. In one of these the bark had been ringed, and the tree had eventually died, but it was found by examining the annual rings that the part above the wound had lived for at least four years after the ringing-operation. Other specimens examined showed from three to five years' growth above the ring-gap.*

In these cases the wood exposed by the injury is perfectly bare, and of course no new layers of wood have been formed on its surface, as the stripping of the bark involves the removal or death of the cambial layer. The outer layers of the wood exposed to the air soon become dry and useless for conduction, hence it is clear that the older layers of wood must be capable of continued fairly rapid transference upwards of water coming from the roots, as evidenced by the continued life of the parts above the ring-gap. In the case of the specimens previously examined, though some of the branches remained fresh, the water supply had proved insufficient to keep the tops of the trees healthy.

The effect of ringing differs in different kind of trees. Various experiments have been made, and a study of the results of the operation proved useful in the early days of plant physiology in leading to a knowledge of the route of conduction of water and of elaborated food-substances in plants. Experiments in ringing were made by Malpighi and Ray, of whom the latter† mentions that a holly tree lived for several years after a ring of bark of a hand's breadth had been removed from the stem so as to leave the wood bare. Since this early observation numerous experiments have been made on several kinds of trees, and form two classes, viz.:—(1) bark-ringing, *i.e.*, the stripping off of a ring of bark as in the cases mentioned above; and (2) wood-ringing, *i.e.*, making an annular cut into the stem through both bark and part of the wood.

Bark-ringing.—The effects of bark-ringing depend upon the interruption of the bark and the exposure of the wood. The break in the continuity of the bark prevents the normal conduction of elaborated food-substances (albuminous and carbohydrate) from the parts above the ring-gap to those below, since these bodies are ordinarily conveyed through the bark‡ (or more precisely the

* By this is meant the annular gap in the bark, made by the operation of bark-ringing.

† Ray, Hist. Plant., T. 1, p. 9.

‡ Any conduction of food-substances that may take place through the wood in the downward direction would be against the transpiration current, and might be expected to be slight. That it is slight or non-existent is suggested by the fact that growth in thickness of the stem practically ceases below the ring-gap.

phloem). Hence, if there are no leaf-bearing branches on the stem below the point of ringing, starvation of the roots ensues. This may be slow, seeing that there is a store of food in the bark of the roots and of the base of the trunk to draw upon, but the growth and absorptive powers of the roots will eventually be checked, and in some cases the functional failure of the roots may be the final cause of the death of the tree.

The exposure of the wood, where the bark has been removed, introduces other factors endangering the life of the tree. The supply of water for the upper part of the tree has all to pass through the wood at the level of the ring-gap, and from several causes the conducting power of this wood tends to become more and more curtailed until the requisite amount of water can no longer pass through it. Owing to the surface of the wood being in contact with the air, the outer layers of wood become dry and useless for conduction. This alone may soon render the water-supply insufficient in species with only a thin zone of sapwood, since true heart-wood is incapable of conducting the transpiration stream. On the other hand "sap-wood trees" (*i.e.*, those which form little or no heart-wood) can usually survive the operation of ringing for a long time, *e.g.*, several years. Among these the progressive drying of the wood from without inwards may finally restrict the area of functional wood until it reaches the critical point, or this result may be accelerated by a fungal disease attacking the wood and rendering some of it useless. Again, in trees which form heart-wood, the production of this accounts for the loss of a certain proportion of the wood available for conduction. While no new wood is added at the level of ringing, and functional wood is lost externally by drying, there is a further loss internally owing to the yearly conversion of some sap-wood into heart-wood.

To summarise, bark-ringing eventually causes the death of the upper part of the tree, because the water supply becomes inadequate, either through loss of conductivity in the wood at the level of the wound, or through deficiency of absorption by the roots.

An interesting example of bark-ringing may be quoted here. A forked pine-tree was chosen by Hartig* for an experiment. The tree was 118 years old, and the trunk was forked at $4\frac{1}{2}$ m. above the soil into two approximately equal stems. The bark was peeled off all round one of these stems at about 3 m. above the point of forking. When the tree was felled 18 years after this ringing operation had been performed, it was seen that the crowns of both stems were still sound, but that the foliage of the ringed stem was thinner and weaker than that of the other stem. It was also found that growth in thickness had practically ceased after ringing on the side of the trunk situated below the ringed branch. The reason for the long-continued life of the ringed stem is that the roots attached to the base of the trunk on the side below the intact stem had received normal nourishment, and therefore, having remained healthy, had been able to supply the trunk with a good supply of water.

* Hartig, Lehrbuch d. Anat. u. Phys. d. Pflanzen, p. 234.

Wood-ringing.—The experiments in wood-ringing made by Strasburger and others* show that, though the inner (older) layers of sap-wood can conduct water for the transpiration current, the heart-wood cannot do so. The first of the following cases serves as an example of a sap-wood tree, the remainder being "heart-wood trees" (*i.e.*, trees which form heart-wood).

Two beech-trees 150 years old had trunks 32 cm. in diameter. These were ring-cut to a depth of 8 cm., and the trees still bore foliage a year and a half later.

The trunk of an oak 50 years old was ring-cut into the heart-wood, and its foliage withered in a few days. Another oak of the same age, which was cut similarly but not quite through the sap-wood, did not wither for some weeks.

The trunk having been cut to the heart-wood in a tree of *Prunus avium*, and in a *Robinia*, wilting of the leaves took place in two days in the first case, and in a few hours in the second.

Various other experiments and observations have been made in bark- and wood-ringing, but enough has been quoted to illustrate the nature of the results obtained in this way.

XLI.—THE BOTANIC GARDEN, UNIVERSITY COLLEGE, CORK.

The following short article on the Botanic Garden of University College, Cork, has been kindly sent by request for publication in the *Bulletin* by Major H. A. Cummins, Professor of Botany and Agriculture in the College. Some photographs of the garden sent with this article have been added to the collection of photographs of Botanic Gardens in the Museums of the Royal Botanic Gardens, Kew.

The University College, Cork, is situated to the West of Cork City. The College was opened in 1849, and up to the establishment of the National University of Ireland in 1908, it was known as the Queen's College.

The original building is in the Collegiate Architectural style of the 15th century.

The existing college grounds comprise a park of about 25 acres, the south branch of the river Lee flowing through the lower part. From the river the land rises, in some parts precipitously to a height of about eighty feet, and the College is situated on the elevated ground. The northern entrance is on the Western road across a bridge spanning the river, and an avenue leads up a gentle slope to the college.

The avenue is bordered on each side by specimen trees and ornamental shrubs. Ascending the avenue, the river and lower grounds are to be seen on the right hand, the latter planted with trees, shrubs, bamboos, and other decorative plants. The central portion has been cleared and tennis courts made for the use of

* Strasburger, Bau und Verrichtungen der Leitungsbahnen (Histolog. Beiträge, 3), p. 515.

the students. The Botanic Garden, Plant Houses, and Biological Laboratory are at the south-east of the grounds, standing in about three acres of land, of which the systematic garden occupies about one and a half acres.

The Biological Laboratory accommodates over fifty students and is directly connected with the Plant Houses.

The Palm House is placed centrally and contains many tropical palms and other plants, of which a few may be mentioned, such as *Brownea* (six species), *Saraca indica* and *Saraca* hybrids obtained from the collection of the late W. H. Crawford, Esq. In the cooler houses are orchids, cacti and other interesting plants. There are some fine specimens of Tree Ferns in a house set apart as a Fernery.

The land for a Botanic Garden was acquired by the College in the year 1877, during the Presidency of the late Dr. W. K. O'Sullivan; the following year the late W. H. Crawford, Esq., offered to defray half the expense of laying out this ground in a suitable manner, and in erecting plant houses.

The Government accepted this offer and contributed the other half of the sum of money required. By the year 1880, the Biological Laboratory, Plant Houses and Botanic Garden were completed.

The original plan of the Systematic Garden being considered unsuitable, Mr. J. Griffin (now Head Gardener) was sent to Kew in 1883, and as a result of his report the present arrangement of flower beds has been fashioned on the design in favour in the Royal Gardens, Kew, at that time.

In the original stocking of the gardens and plant houses, specimens of plants were presented by the National Institutions of Kew, Glasnevin, and by Trinity College, Dublin, and by numerous private persons. Since then the stock has been kept up both by purchase and presentations.

In addition to the systematic garden there are rock-gradens in both the upper and lower grounds, as well as artificial ponds for the cultivation of water lilies; these ponds are useful to students as they form a habitat for many forms of *Algae* as well as of small aquatic animals and *Protista*. Bog plants thrive in an artificial bog, made in a concrete basin, especially built for the purpose. The surroundings of the students' clubs are bedded out with decorative plants; shrubs have been set along the walls in the college quadrangle, and they flower profusely, as the position facing south, enables them to obtain the maximum of sunshine, while buildings provide a shelter from cold winds.

The Herbarium includes a considerable number of species of native plants; the foreign floras are represented by a large collection of American plants.

Indian material is chiefly composed of specimens presented by the Director of the Royal Botanic Gardens, Calcutta.

Mosses, Lichens, and marine Algae are fairly well represented in the Herbarium. Every opportunity is taken of adding to the above collections.

XLII.—MISCELLANEOUS NOTES.

Mr. G. G. Auchinleck, B.Sc., Agricultural Superintendent, Grenada, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Assistant Director and Chemist in the Department of Agriculture, Mauritius.

Mr. F. Birkinshaw, Assistant Agricultural Superintendent, St. Vincent (*K. B.* 1912, p. 350), has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Instructor of Agriculture in the Department of Agriculture, Mauritius.

Mr. George Farmer has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Agricultural Instructor for the Coast Region of the East Africa Protectorate.

Mr. J. Jarrett, lately a member of the gardening staff of the Royal Botanic Gardens, has been appointed, on the recommendation of Kew, a Sub-Inspector for the purposes of the Destructive Insects and Pests Acts under the Board of Agriculture and Fisheries.

Mr. M. B. Scott, M.A., and Mr. W. B. Turrill have been appointed by the President of the Board of Agriculture and Fisheries, on the results of a competitive examination, Assistants in the Royal Botanic Gardens, Kew.

Mr. T. F. Chipp, B.Sc., Assistant Conservator of Forests, Gold Coast (*K. B.* 1910, 132), has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Assistant Director of Gardens in the Straits Settlements.

Mr. Alfred Redmayne Bell, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, a Curator in the Agricultural Department of Nigeria.

Retirement of Mr. N. E. Brown.—After forty years' continuous service Mr. Brown retired from the post of first-class Assistant in the Herbarium on July 10th, having reached the age limit. A native of Redhill, and a born naturalist, Mr. Brown's occupation has been the pleasure of his life. Like many others, whose love of nature is an early development, Mr. Brown studied natural history generally in his school days, but entomology was perhaps his favourite pursuit. On leaving school he was appointed Curator of Mr. W. W. Saunders's then well-known museum of

natural history at Reigate. In February, 1873, he entered the Kew Herbarium, and thereafter devoted practically the whole of his time to botany, and especially to the study of the rich flora of South Africa. But his activity has not been limited to taxonomy and descriptive work, though he published little in other branches, and his microscope has always been a source of great enjoyment to him. His knowledge of the distribution of plants has been of great service to the institution and has also been employed in the instruction of many generations of gardeners. In 1879 he received the honour of being elected an Associate of the Linnean Society. The Journal of the Kew Guild for 1904 contains a portrait of Mr. Brown, and an appreciation of his work, more especially in its relation to horticulture; and the *Kew Bulletin* for 1897 and 1907 contains almost complete lists of his very numerous publications. This is not the place for particulars, but his contributions to our knowledge of such difficult groups as the *Asclepiadaceae, Araceae, Euphorbiae* and *Ericaceae* are models of critical and thorough work. Mr. Brown also possesses a profound knowledge of cultivated succulent plants, but more pressing claims on his time have up to the present prevented him from giving this knowledge full practical development. Of his work generally it may be said that it is finished, so far as materials permitted. The Herbarium contains lasting and invaluable evidence of his industry with pen and pencil, and of his clever preparation of specimens of plants difficult to preserve. He has begrudged no time to complete details, and perfunctoriness is unknown to him. None can surpass him in discovering points of difference as well as points of resemblance. As a colleague he has been always obliging, amiable, and unselfish. His official disappearance from his seat will be regretted by all of his associates, and he leaves with their best wishes for a serene and happy retirement. W. B. H.

The genus Rosa.*—A copy of this sumptuously illustrated work, which is dedicated to Her Majesty Queen Alexandra, has been presented to the Library of the Royal Botanic Gardens, Kew, by Miss Willmott, F.L.S., V.M.H. The work contains about 132 beautifully coloured plates, drawn from nature by Alfred Parsons, R.A., and 83 uncoloured, the latter representing fruiting specimens or species at present only known from dried specimens. It was issued in twenty-five parts, and is intended to be bound in two volumes. The work contains an Historical Introduction, an illustrated Glossary of terms, and an analytical Key to the classification of the groups, with a comprehensive general Index. The botanical descriptions are by Mr. J. G. Baker, F.R.S., a leading authority on this critical genus. Miss Willmott's book is the outcome of many years' study of Roses, during which a very large collection of species and old garden forms were got together at Warley, but the author has aimed at collecting the evidence from every available source, giving her own opinion as seldom as

* The genus Rosa. By Ellen Willmott, F.L.S. Drawings by Alfred Parsons, R.A. London: John Murray, Albemarle Street, W.

possible. The history of each species is very fully given, especially those which are of horticultural importance, and there is an exhaustive list of references and figures. In a number of cases materials were not available for illustration. The numerous hybrids are also very fully indicated, and in those cases where they have formed the starting point of distinct races of garden Roses, the history, and an illustration are also given. The last number contains a number of Chinese Roses received too late for inclusion in their proper sequence; several of these are new, and others are figured here for the first time. They are partly from Roses communicated by M. Léveillé, and partly from seedlings raised at Warley from seeds collected by Mr. E. H. Wilson, whose travels in China have resulted in several interesting additions to the genus Rosa. Of the beauty and accuracy of the plates it is difficult to speak too highly, and Miss Willmott must be congratulated on the production of a work that will form a landmark in the history of this beautiful and difficult genus. R. A. R.

Poisoning by Sorghum halepense.—Some recent correspondence in the "Indian Forester," vol. xxxix. nos. 6 and 10, upon the value of *Sorghum halepense*, Pers., as a fodder grass, and the danger to cattle and horses which its use entails, shows that the exact nature and reactions of the dangerous constituent are not well understood. There is conclusive evidence that the young vegetative parts of *S. halepense* are, under certain conditions, poisonous to farm animals, and as the plant is, after rice, probably the commonest food and fodder plant in India, besides being much used elsewhere, it has been deemed desirable to publish a short note dealing with the matter.

In 1902 Dunstan and Henry (Phil. Trans. Roy. Soc. A, 199, p. 399), isolated a glucoside, which they called dhurrin, from the leaves of the great millet (*Sorghum vulgare*). This substance was found to have the empirical formula C_{14} H_{17} O_7 N, and on hydrolysis with hot dilute hydrochloric acid or the enzyme emulsin, yielded one molecule each of prussic acid, parahydroxybenzaldehyde, and dextrose.

Sorghum halepense, Pers. (*Andropogon halepensis*, Brot.), is considered by Hackel to be a variety of *S. vulgare*, Pers. (*Andropogon Sorghum*, Brot.), and there is little doubt that dhurrin is found in it as well as in the typical plant. The free prussic acid is the actual substance which causes the death of animals eating the young vegetative parts of *Sorghum*. The enzyme emulsin is present in the parts of the plant containing the glucoside, and when in the early processes of digestion the two come together the emulsin by the addition of water to the dhurrin breaks the latter down and liberates the poisonous prussic acid.

An examination of the numerous records of cases in which *Sorghum* was used for fodder establishes two facts of practical importance. Firstly, the young vegetative parts of the plant are the most dangerous to stock, the mature plant being nearly or quite harmless. Analyses of old plants have shown that little or no prussic acid yielding substance was present. Secondly, the

poisonous effect of the grass is enhanced in times of drought. One writer states that the grass is dangerous only in the green state, and that if the same grass is cut and dried and used for fodder, it has no injurious effect. This may be due to the destruction of the glucoside or the emulsin, or both, by the drying of the grass without their coming into contact with each other, but it is possible that the grass was not cut till near maturity, that is to say after the disappearance of the prussic acid yielding glucoside.

W. B. T.

Derris involuta.—This species has been identified in the Kew Herbarium with *D. oligosperma*, K. Schum. et Lauterb., by Mr. S. T. Dunn, who is preparing a revision of the genus; and the reduction was accepted in Bot. Mag. t. 8530. During a recent visit to Berlin, however, the writer had the opportunity of comparing *D. involuta* with the type of *D. oligosperma*, and the differences then observed led to the conclusion, in which Dr. Harms concurred, that the two species were undoubtedly distinct. The following notes may serve to prevent them from being confused in the future.

Derris oligosperma, *K. Schum. et Lauterb.*

Leaflets cordate at the base, obtuse and very distinctly mucronulate at the apex; midrib and lateral nerves impressed on the upper surface, much raised on the lower; lateral nerves very oblique, the middle ones running for more than half the length of the leaf before curving away from the margin; reticulation not evident on the upper surface.—Native of New Guinea.

Derris involuta, *Sprague.—D. oligosperma,* Bot. Mag. t. 8530. Leaflets obliquely rounded or obtuse at the base, retuse or subtruncate and indistinctly mucronulate at the apex; midrib and lateral nerves slightly raised on the upper surface, rather more raised on the lower; lateral nerves less oblique than in *D. oligosperma,* the middle ones running for less than half the length of the leaf before curving away from the margin; reticulation evident on the upper surface.—Native of Queensland and New South Wales.

The comparison has been confined to the leaves, as the flowers of *D. oligosperma* are still unknown.

T. A. S.

Botanical Magazine for August.—The plants figured are *Cyrtosperma Johnstoni,* N. E. Brown (t. 8567); *Meconopsis rudis,* Prain (t. 8568); *Rosa setipoda,* Hemsl. and E. H. Wils. (t. 8569); *Zingiber Mioga,* Roscoe (t. 8570), and *Cotoneaster Franchetii,* Bois (t. 8571).

The *Cyrtosperma* is an Aroid introduced from the Solomon Islands by the late Mr. William Bull, who distributed it under the name of *Alocasia Johnstoni.* It is a very distinct plant and of considerable ornamental value, with its red-veined, arrow-shaped leaves. Petioles and peduncles are spiny, and the erect spathe, which is about 6 inches long, is dark violet and slightly polished outside, while inside it is dirty whitish-green faintly flushed with

rose. The drawing was prepared from a fine specimen which flowered in the Nepenthes House at Kew in August, 1913.

Meconopsis rudis, a native of Szechuan and Yunnan, Western China, has been introduced into European gardens through Mr. E. H. Wilson and Mr. G. Forrest. The Kew plants which provided material for the figure were raised from seeds collected by the former and presented to the establishment by Professor C. S. Sargent of the Arnold Arboretum. It is a monocarpic herb with a prickly stem, which reaches a height of 3 feet, and raceme-like cymes of sky-blue flowers, sometimes flushed with purple, occasionally entirely pale purple. From its near ally, *M. aculeata*, Royle, it may be easily distinguished by its entire or nearly entire leaves and by its flowers always having more than four petals.

The rose is a native of Hupeh, Central China, and has been introduced into cultivation by Messrs. James Veitch & Sons, in whose nursery at Coombe Wood it flowered last year. It has a general resemblance to *R. macrophylla*, Lindl., and its large corymbs of rose and white flowers are distinctive owing to the numerous foliaceous bracts and the spreading gland-tipped bristles which clothe the long pedicels.

Zingiber Mioga is a Japanese plant which, under the name of "Mioga," is valued in its native country for its aromatic properties. The young inflorescences and leafy shoots are used for flavouring soups and pickles, and as a spice. The drawing was made from material obtained from a plant imported from Japan and presented to Kew by Mr. H. J. Elwes. Its flowers are very pale yellow.

The *Cotoneaster* is an attractive species first introduced by Mr. M. L. de Vilmorin, who received seeds collected in Western China from the Abbé Soulié. Plants were raised at Les Barres, and in 1901 that from which the figure was prepared was presented to Kew by Mr. Vilmorin. It has a graceful habit, with arching elegant branches, and in the autumn, when its rather large orange-red fruits are ripe, it forms a strikingly handsome shrub. It is very hardy and grows freely at Kew.

Fortune's Double Yellow Rose.—A fine flowering specimen of an old historic Rose has been sent by the late Director, Sir William T. Thiselton-Dyer, K.C.M.G., Witcombe, Gloucestershire, with an enquiry as to its botanical origin. A search revealed the fact that although it was figured in the Botanical Magazine in 1852 (t. 4679) there was no specimen in the Herbarium, and that it has been more or less confused with *Rosa Fortuneana*, Lindl. (Paxt. Fl. Gard. ii. p. 71, fig. 171), a hybrid between *R. Banksiae* and *R. laevigata* (for example *R. Fortuneana*, Lem. Jard. Fleur. iv. t. 361 is simply a copy of the Botanical Magazine plate). Hemsley remarks (Journ. Linn. Soc. xxiii. p. 249) that *R. Fortuneana*, Lindl., is probably a hybrid between *R. Banksiae* and *R. indica*. Baker refers Fortune's Double Yellow to *R. chinensis* var. *pseud-indica*, which is regarded as identical with *R. pseud-indica*, Lindl. (Monogr. Ros. p. 132), which was based on a painting of a double yellow Chinese Rose in Lambert's Herbarium, but

this old drawing seems to have been completely lost sight of. Enquiry at the Natural History Museum, South Kensington, the Lindley Herbarium at Cambridge, and the Delessert Herbarium at Geneva (which acquired some of Lambert's specimens), has failed to trace it. Lambert's collections were sold by auction, and it would be interesting to trace the whereabouts of this original drawing. Fortune's Double Yellow also bears the name of Beauty of Glazenwood and *Rosa amabilis*, Germaine de St. Pierre. Crepin (Journ. Roy. Hort. Soc. xi. p. 220) remarks that it seems very probable that it is only a garden variety of *R. gigantea*, but the idea is not borne out by comparison. It is most like a form of the variable *R. indica*, or a variety of it, but the natural limits of this species are so much obscured by hybridisation that it is difficult to form an opinion. At all events there is now dried materials at Kew which will be available for future comparison. R. A. R.

Mahonia Fortunei and M. confusa.—An enumeration of the Asiatic species of *Mahonia* is given by C. K. Schneider in Sargent, Plantae Wilsonianae, part 3, pp. 378-385, issued May 15th, 1913. To the species there mentioned should be added *M. confusa*, Sprague in *Kew. Bull.* 1912, p. 339 (published September, 1912). This is a species which was confused by Fedde with *M. Fortunei*, from which it may be distinguished by the terminal leaflet being separated from the uppermost pair by an internode of the rhachis, by the larger number of leaflets, which are of a different shape, and by other characters.

Schneider's *Mahonia Fortunei* evidently includes *M. confusa*, as he quotes *Henry* 3117, one of the types of that species. The only other specimen quoted by Schneider as seen by him is *Wilson* 2882 (Arnold Arboretum Expedition). It is doubtful to which species this belongs, as the number is not yet represented in the Kew herbarium. T. A. S.